Effect of Spouse Support and Health Beliefs on Medication Adherence

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This study addressed the issue of social support for patients' adherence to medical regimens. Social support of wives was assessed by structured interview of 150 male participants in the Coronary Primary Prevention Trial, their wives, and medical staff. In addition, wives were interviewed about their beliefs related to their husbands' health and participation in the trial. Unobtrusive packet counts were used as the measure of adherence. The participants were classified as having high spouse support if wife support scores were in the top one third of the distribution and as having low spouse support if scores were in the bottom one third as measured from inquiry of the participant, the spouse, and the staff. The adherence of men having low support averaged 70 percent, significantly lower than the high-support group, which averaged 96 percent. The correlations between spouses' health beliefs and their level of support were significant for three of four health belief variables. In particular, highly adhering men had wives who believed more strongly in the benefits of the Coronary Primary Prevention Trial.

Despite advances in biomedical treatment technology, many patients remain ill because they do not adhere to prescribed therapeutic regimens. Hypertension provides a useful illustration of the problem: over 50 percent of hypertensive patients have been found to discontinue therapy within one year of starting treatment.[1-3] Among patients who persist in medical treatment, an estimated 40 percent fail to take enough of their medication to achieve benefits.[4,5] A commonly mentioned rule of thumb among researchers in this area is that only one fourth of hypertensive individuals are under treatment and that only one half of those under treatment are actually controlling their blood pressure.[4] Clearly, treatment technology has surpassed patient management in modern medicine.

This study examines the influence of spouse support on patient adherence or compliance, with the health beliefs of the spouse postulated as predictors of the level of spouse support. Following Caplan,[6] social support is defined here as *behavior directed toward providing the patient with physical, informational, or socioemotional resources that are believed to promote well-being.* As reviewed in Doherty and Baird,[7] there is reasonably strong research evidence linking family support and patient adherence. Haynes et al[8] summarized the results of the investigations that used variables related to social support, eg, influence of family, interpersonal relations. The authors reported that 33 studies showed a positive relationship between social support and adherence, 18 studies showed no relationship, and one study found a negative relationship between social support and adher-

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ence. However, as Levy[9] has noted in her critical review of this literature, most of these studies were marked by three important limitations: (1) reliance on self-reported measures of adherence, (2) failure to specify which supportive behaviors were associated with adherence, and (3) the lack of multiple measurements of social support. Finally, little research outside the pediatric literature has examined the predictors of social support, in particular whether family members' health beliefs are related to their level of social support.

The relationship between health beliefs and adherence has been the subject of intense interest from proponents of the health belief model.[10] Briefly, this model proposes that four health beliefs and expectations held by patients increase the likelihood that these patients will adhere to medical regimens. Perceived *susceptibility* is the extent to which the patient believes that he or she is likely to develop a particular disease or to be affected by the sequelae of a disease. Perceived *severity* is the patient's assessment of the harmful or disruptive impact of having the disease. Perceived *benefits* refer to the patient's assessment of the favorable results offered by the prescribed therapy. Perceived *costs* refer to the patient's judgment of the discomfort, inconvenience, and other disadvantages of cooperating with the treatment. These health beliefs have been studied almost exclusively as individual-patient variables and as a way to assess parents' motivation to help their children cooperate with treatment. In both cases the research results have been consistently positive, though only small amounts of adherence variance have typically been accounted for by health beliefs.[11] In addition, most of the studies related self-reported health beliefs to self-reported adherence, creating a possibly confounding measurement overlap. The present study extends the health belief model to the spouses of adult patients and uses an objective measure of adherence. It is predicted that spouses' health beliefs (susceptibility, severity, benefits, costs) related to their partners' medical condition will be associated with the social support they offer their partners.

In light of this information and the gaps in the literature, this study was designed to investigate three questions: (1) is support from the spouse associated with higher patient adherence to medication, (2) what specific actions by the spouse help patients adhere, and (3) are spouses' health beliefs related to their level of support for their partners?

Methods

The patient sample consisted of 150 middle-aged men participating in the Coronary Primary Prevention Trial at the University of Iowa's Lipid Research Clinic. These men were recruited into the trial at least four years prior to the present study because of their elevated serum cholesterol levels and no evidence of heart disease. They were mostly working-class and middle-class white men, aged from 40 to 65 years. In the double-blind design, one half of the men were taking a cholesterol-lowering medication and one half were on placebo. The research assistant (LM) contacted 178 men during a four-month period when they attended their regular clinic visit; 150 consented to participate in the study (84 percent). Each participant was asked permission to contact his wife for a telephone interview. All consented; however, four wives refused an interview, and two were out of town and unavailable, leaving a sample of 144 wives. Finally, to assess spouse support from the perspective of the health care team, the research assistant also interviewed the four staff members (two dietitians and two nurses) with the longest acquaintance with the men.

Letters explaining the study were mailed to married participants whose appointments were scheduled during the study period. Each consenting participant was given a face-to-face structured interview by a research assistant. The interview lasted about one-half hour. Wives were interviewed by telephone, and staff members were interviewed individually in face-to-face fashion.

The structured interviews had two parts: a health belief section and a social support section.

Wives' health beliefs were measured by a modified health belief scale[10] developed for this study. Four health beliefs were measured as follows:

Belief in the *susceptibility* of her husband to negative consequences of high cholesterol was measured by asking the wife to rate (on a scale of 100 percent) her level of certainty that her husband will get each of the following illnesses as a result of high cholesterol: heart attack, stroke, kidney failure, poor circulation in the legs, and angina.

Belief in the *severity* of any negative consequences of high cholesterol was measured by asking the wife to rate her level of worry (5-point Likert scale) about how much any cholesterol-related medical problems would "negatively affect his day-to-day activities," "cause him to be seri-

ously ill," or "die suddenly." A fourth question concerned her general level of worry about such medical complications.

Perceived *benefits* of her husband's participation in the Coronary Primary Prevention Trial were measured by eight items (using the same Likert scale) eliciting the wife's perceptions of the benefits of the whole program and its component parts, such as the medicine, the diet, and the annual physical examinations.

Perceived *costs* were measured in the same format by five questions eliciting the wife's perceptions of the inconveniences and other bothersome aspects of her husband's participation in the program.

These scales yielded summed scores for each of the four health belief variables. Cronbach alpha coefficients for the scales suggested adequate internal consistency reliability for the health belief instrument: susceptibility ($\alpha = .85$), severity ($\alpha = .76$), benefits ($\alpha = .76$), and costs ($\alpha = .58$).

Social support from the wife was assessed from the perspectives of the participant, the wife, and the staff members. The participant was asked questions about his wife's attitude toward the program (from very positive to very negative), her encouragement of his participation, and the specific behaviors (from an 11-item checklist) she had engaged in during the previous two months that either aided or impeded his efforts to adhere to his regimen. Those social support items having high intercorrelations (eight single items plus the summed behavioral checklist) were combined into a social support index for data analysis (Cronbach $\alpha = .88$). The wife's perception of her social support for her husband was assessed by a combined score on four questions asking her whether she thinks she is helpful and what specifically she does to help ($\alpha = .76$). Staff perception of wife support was assessed by means of a global question asking the staff members to rank the participants on how much support (encouragement, advice, help, information, etc) they receive from their wives. The final staff score for each participant consisted of the average ranking across the four staff members.

This three-way approach to measuring support from the wife was intended to tap the different perspectives of the participant, wife, and staff, which should offer complementary measures of wife support. To test whether these scores were indeed independent, Pearson correlations were computed among them. Husbands' support scores (the combined social support index) correlated with wives' scores at .396 and with staff scores at .292. Wives' and staff scores correlated at .255. These moderate correlations suggest that the three support scores represent complementary perspectives on wife support rather than identical measures.

Table 1. Wife Support Correlations (*r*) With Adherence

	r	P	n
Wife report	.223	.007	144
Husband report	.188	.021	150
Staff report	.438	.001	150
$R^2 = .187$			

Adherence was measured at the time of the clinic visit by means of an unobtrusive packet count. At each appointment during the trial the participants were given a box of medication packets. Participants were given more packets than they could use and were asked to return the unused packets. The men were quite faithful to this responsibility. The adherence packet count was calculated as the number of packets used divided by the number that should have been consumed during the intervening two-month period. For this study, the percent packet count on the day of the interview was used as the measure of adherence.

The following additional demographic data were gathered and analyzed as possibly confounding variables: age, number of children at home, occupational status, and race. Since statistical analyses indicated no difference in the results when these variables were included, they will not be presented in the Results section.

Results

The sample proved to be a highly adhering group. The mean adherence score was 82 percent (median, 96 percent) with a standard deviation of 30 percent and a range from 0 percent (n = 9) to 100 percent (n = 33). The loading of adherence scores on the high end of the continuum probably attenuated the statistical relationships found between adherence and the other variables, most of which were normally distributed.

Wife Support and Participant Adherence

Table 1 presents the Pearson product correla-

Table 2. Comparison of High and Low Wife Support Groups*

	Adherence		
	M	SD	n
Low support	70%	38.03	29
High support	96%	4.65	28

*Based on a consensus of participant, wife, and staff; $t = 3.64$, $df = 29$, $P < .001$ (separate variance t test)

Table 3. Wives' Health Beliefs Correlations With Social Support

	Wife-Reported Support		
	r	P	n
Susceptibility	.192	.021	144
Severity	.166	.046	144
Benefit	.204	.041	144
Cost	−.061	ns	144

tions between wife support—as measured by the wife, the participant, and the staff—and adherence. Results indicated significant correlations in the expected direction for all three measures of wife support: higher wife support was associated with higher adherence. Staff correlations might be higher because only staff members were aware of participants' packet count adherence levels.

Table 2 presents results of an analysis that used the combined scores of the wife, the participant, and the staff in the following way: participants were assigned to the high-support group if they were found in the top one third of the wife support scores of the wife, the participant, and the staff; they were assigned to the low-support group if they were in the bottom one third of all three scores. In other words, the two groups in Table 2 represent consensus high- and low-support groups. Results of the t-test comparison between the mean adherence scores of the two groups indicated that the high-support group significantly surpassed the low-support group in adherence (96 percent to 70 percent).

Specific Wife Behaviors Associated With Adherence

Part of the participant's social support interview was a behavior checklist of actions his wife may have taken to help or not help him during the previous two months. The following behaviors by the wife were found to be positively and significantly correlated with adherence: (1) showing an interest in the program ($r = .232$, $P = .004$), and (2) reminding him to take his medicine ($r = .183$, $P = .025$). One behavior was negatively and significantly correlated with adherence—nagging him about his medicine or his diet ($r = -.231$, $P = .004$).

Spouse Health Beliefs and Social Support

Table 3 presents the correlations between wives' four health beliefs and their own report of the amount of social support they offer their husbands to adhere to the Coronary Primary Prevention Trial. Results indicate significant correlations in the expected direction for susceptibility, severity, and benefits, but not for costs. All the significant correlations were low in magnitude, similar to health belief correlations in other settings.[11]

A step-wise multiple regression analysis was used to determine which of the health belief variables accounted for unique variance in wife-reported social support scores. This analysis revealed that benefits and susceptibility accounted for most of the variance in social support scores, with severity accounting for little unique variance.

Although wives' health beliefs correlated significantly with their own reports of their social support for their husbands, these health beliefs of wives did not correlate significantly with either husband or staff ratings of wife support. However, when the extreme consensus groups on social support (top third and bottom third on all three measures of wife support) were compared on wives' health beliefs, the results indicated that the high-support group had wives with significantly higher scores on perceived benefits ($t(53) = 3.20$, $P = .002$). The two groups did not differ on the other three health belief variables.

Discussion

This study adds further support to previous research indicating the importance of family support for patients' adherence to long-term medical regimens. Men in this study who had highly supportive wives were significantly more likely to adhere to their medication regimen than were men with less supportive wives. This finding was bolstered

by two methodological advantages of the present study: the use of an objective measure of adherence (the unobtrusive packet count), and the use of multiple measurements of wife support (from the perspectives of the participant, the wife, and the staff). The adherence rate difference between the high- and low-support groups (96 percent vs 70 percent) has been associated in one study of hypertension control with good vs poor clinical outcome.[12]

The second major finding concerned the health beliefs of wives as predictors of their level of social support for their husbands. Results of several statistical procedures relating health beliefs to social support gave the strongest support for the notion that wives who believe more strongly in the benefits of the therapeutic program were more likely to offer high support to their husbands. This benefits variable accounted for most of the variance in wives' self-reported social support for their husbands, with perceived susceptibility accounting for a lesser amount of unique variance. Moreover, only benefits significantly differentiated the consensus high- and low-support groups, a finding that further emphasizes the singular contribution of the wife-perceived benefits dimension over the other three health belief variables.

The third finding of the study relates to the specific wife behaviors that correlated significantly with patient adherence. Not surprisingly, these consisted of reminders and encouragement as positive influences on adherence and nagging as a negative influence on adherence. Since the interview contained no definition of nagging, each participant had to define it for himself.

Two notable limitations of this study deserve mention. First, the sample was not a normal treatment group: the participants were all male, mostly white, middle-aged, and involved in a longitudinal research study with a double-blind design. Since the least adherent had probably dropped out of the study years ago, the present sample was skewed positively on adherence scores. Furthermore, the possibility of being on a placebo may have been a confounding influence on the adherence of some participants. A second set of limitations concerns the correlational and cross-sectional nature of the present investigation. The results do not permit clear causal inferences, since neither social support nor health beliefs were manipulated by the researchers. It could be, for example, that persons who are high adherers also tend to attract more social support, or that wives' health beliefs and their social support are aspects of some other unmeasured dimension.

Because of these limitations, the present study is viewed as preparatory for intervention studies designed to test the efficacy of providing adherence counseling for patients and their families. There is a need to document experimentally both improved adherence and improved clinical outcomes from involving the family in treatment. Based on the protocol for family compliance counseling described in Doherty and Baird,[7] the authors are currently conducting an intervention study on uncontrolled hypertensive patients and their families. In the meantime, the present study has attempted to incorporate some theoretical and methodological improvements into the growing research literature on this central issue in family medicine.

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